NCPTT Grants

As part of the National Historic Preservation Act Amendments of 1992, Congress created the National Center for Preservation Technology and Training (NCPTT), the NCPTT advisory board—the Preservation Technology and Training Board, and the Preservation Technology and Training Grants program (PTTGrants). PTTGrants are awarded to eligible applicants with a demonstrated institutional capability and commitment to NCPTT's purpose and mission—to advance the art, craft, and science of historic preservation in the fields of archeology, historic architecture, historic landscapes, objects and materials conservation, and interpretation. PTTGrants support an effective and efficient system of research, information distribution, and skills training in all the related historic preservation fields.

The following articles describe three projects that received PTTGrants over the past two years. For more information about NCPTT and its grants program, telephone 318-357-6401 or write to NCPTT, NSU Box 6582, Natchitoches, LA 71497.

Nan-Yao Su

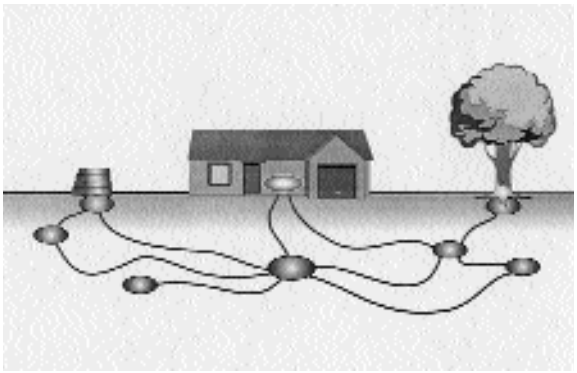
Protecting Historic Buildings and Structures from Termites

Termites are important structural pests in the United States costing the public approximately $1.5 billion dollars each year. Of the many different species of termite, subterranean termites account for approximately 80% of the annual cost for termite control. Historic buildings and structures are particularly vulnerable to subterranean termite damage, given the traditional use of wood as a building material. In addition to the financial costs associated with the treatment of a termite infestation, termite damage to historic buildings also results in the loss of building fabric thus greatly diminishing the historic integrity of a building or structure.

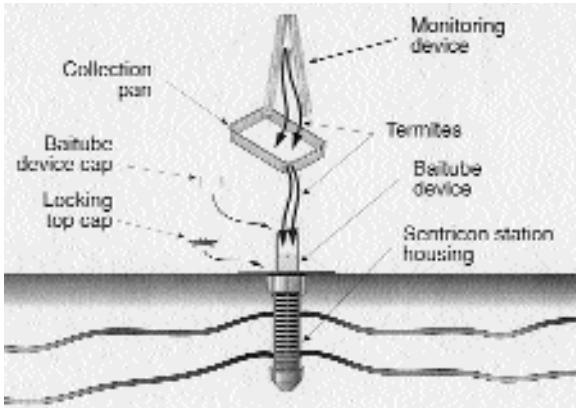
Conventional methods for the control of termite infestations rely heavily on the use of organic insecticides. For the last half century, residual insecticides have been used to provide a barrier for the exclusion of soil-borne termites from a structure. Typically, large quantities of liquid termiticide are applied to the soil beneath and surrounding an infested building. Creating an uninterrupted barrier of treated soil, however, is extremely difficult because of variables such as soil type, texture, and moisture content as well as foundation type and construction methods. If gaps in the soil barrier occur, subterranean termites may eventually find the untreated soil and make their way back into the structure, causing more damage and necessitating further treatment. More importantly, soil treatment only deters termite attack. Subterranean termites form large colonies that may contain literally millions of termites. This vast population forages underground, often over great distances (300'), in search of food. Foragers migrate back and forth between the food source and the nest, bringing food to the queen and ensuring the survival of the colony. The vast proportion of subterranean termites are, thus, unaffected by soil treatments.

As an alternative to conventional soil insecticides scientists have explored the use of toxic baits which take advantage of the foraging behavior of subterranean termites. It is theorized that if a slow-acting toxicant could be incorporated into a food source, the foraging termites may deliver the toxicant directly to the subterranean termite colony (Su et al. 1982). The use of a slow-acting toxicant is critical because termites will avoid sick or dead termites. An extensive laboratory screening program conducted during the early 1980s by the University of Florida and DowElanco (Su and Scheffrahn 1993) identified the insect growth regulator, hexaflumuron, as an ideal toxicant to be used with termite baits. Unlike traditional insecticides, insect growth regulators disrupt the growth process of certain insects effectively at extremely low concentration while being relatively benign against other organisms. Initial field trails with hexaflumuron yielded surprisingly good results. (Su 1994a). Less than 0.05 oz. of hexaflumuron was needed to kill a subterranean termite colony of several millions individuals. Moreover, elimination of colony populations created a zone of termite-free soil surrounding a building for several years (Su 1994b).

Other studies soon followed and confirmed that termite colonies were suppressed to the point of inactivity (or elimination) when hexaflumuron baits were applied (DeMark et al. 1995, Su et al.



A subterranean termite colony includes several inter-connected foraging loci that may contain several million termites foraging up to 300' in soil.



When termites are detected in a station,the monitoring device is replaced with a tube containing a Recruit™ bait laced with a minute amount of hexaflumuron. Termites collected from the monitoring device are then dislodged into the tube to "self-recruit"the nestmates into the bait.

1995, Forschler and Ryder 1996, Grace et al. 1996). These studies led to the development of the first commercial termite bait, the Sentricon™ Termite Colony Elimination System (DowElanco, Indianapolis, IN). The Sentricon System employs a cyclical process of monitoring and baiting for termite activity. First, Sentricon stations containing the monitoring devices are installed in the soil surrounding a home. When termites activity is discovered in a station, the monitoring device is replaced with a tube containing a Recruit™ bait laced with a minute amount of hexaflumuron. Termites collected from the monitoring device are then dislodged into an empty space on the top of the tube, called the "recruiter's chamber." Termites placed in the recruiter's chamber must eat their way out of the bait to reunite with nestmates. Left behind in the bait are their species- and colony-specific odors, such as trail pheromones, which guide other termites to the bait. This self-recruiting procedure enhances bait uptake by termites (Su 1994a). Hexaflumuron kills insects only when they molt every 1–2 months. During this period, the bait is thoroughly distributed throughout the colony population. It may take several months to achieve the colony elimination, but the result is sweeping. Once the colony is eliminated, monitoring continues to detect further termite activity.

A similar baiting procedure is presently under development for the eradication of termite colonies situated above-ground where there is no soil contact. Field studies, thus far, have been successful.

The Sentricon system has been commercially available since May 1995. A recent survey of 128 commercial Sentricon application sites showed a success rate of 88% of the sites with suppression and elimination of termite colonies; 9% of the sites had no termites (either in the stations or in the structures) and only 3% of the sites required additional soil termiticide treatments. As an alternative to conventional soil termiticides, this system holds great promise, particularly for the treatment of historic buildings and structures where the introduction of baits is considerably less intrusive and more environmentally friendly. Field trials, funded in part by the National Center for Preservation Technology and Training (NCPTT), are presently underway at a number of National Park Service sites, including the Statue of Liberty. Trials are also underway in the French Quarter of New Orleans where many historic as well as commercial properties are suffering from a severe infestation of the Formosan subterranean termite introduced after the Second World War from the Far East. A new initiative to bait and monitor an entire city block of buildings bordering Jackson Square in New Orleans is also planned. This block includes a number of historically-significant buildings such as St. Louis Cathedral (c. 1789), The Cabildo (c. 1795), Creole House (c. 1842), The Presbytere (c. 1791), The Arsenal (c. 1839), Jackson House (c. 1842), and The Labranche Row buildings (c. 1839). These trials represent the first attempt at using baits on a large scale for the control of subterranean termites and may well be the future of termite pest control in the United States.

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